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Docket No.: MOH-P010111

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MAIL STOP: APPEAL BRIEF-PATENTS

By:  Date: December 17, 2007
Laurence A. Greenberg

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
Before the Board of Patent Appeals and Interferences

Applic. No. : 10/692,637 Confirmation No.: 8633
Inventor : Michael Liebler-Ranzus
Filed : October 24, 2003
Title : Spacer for a Fuel Assembly of a Boiling Water Reactor
TC/A.U. : 3663
Examiner : Alexandra F. Awai
Customer No. : 24131

Hon. Commissioner for Patents
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir:

This is an appeal from the final rejection in the Office action dated April 16, 2007,
finally rejecting claims 1, 2 and 4 - 6.

Appellants submit this *Brief on Appeal* in triplicate, including payment in the amount
of \$510.00 to cover the fee for filing the *Brief on Appeal*.

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Real Party in Interest:

This application is assigned to Areva NP GmbH of Germany.

Related Appeals and Interferences:

No related appeals or interference proceedings are currently pending which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

Status of Claims:

Claims 1, 2 and 4 - 6 are rejected and are under appeal.

Status of Amendments:

No claims were amended after the final Office action.

Summary of the Claimed Subject Matter:

The subject matter of independent claim 1 is described in the specification of the instant application. An explanation of the subject matter defined in claim 1, referring to the specification by page and line numbers, and to the drawings, is given below.

According to 37 CFR § 41.37(c)(1)(v) *Summary of Claimed Subject Matter*, only the subject matter defined in each of the appealed independent claims is to be explained by page and line number of the specification.

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Regarding the dependent claims, it is only means plus function clauses which need to be explained.

Claim 1 is the only independent claims and there are no means plus function clauses in the appealed claims.

In the following concise explanation, the wording of claim 1 is bolded and the concise explanation is indented.

Independent claim 1 calls for:

A spacer for a fuel assembly of a boiling water reactor, comprising:

The spacer is identified by reference numeral 1 in Figs. 1-3 and is described between page 6, line 17 and page 6, line 19 of the Specification of the instant application.

a frame formed with outer webs and inner webs oriented crossways with respect to one another;

The inner webs are identified by reference numeral 2 and the outer webs are identified by reference numeral 3 in Figs. 1-4 and are described between page 6, line 17 and page 8, line 5 of the Specification of the instant application.

gills formed on an outer side of said outer webs and projecting outward to a given extent from said outer side;

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The gills are identified by reference numeral 5 in Figs. 1 and 3, their projection is seen in Fig. 3 and both are described between page 6, line 23 and page 7, line 11 of the Specification of the instant application.

a plurality of projections each formed by an outward bulge in a wall of said outer webs,

The projections are identified by reference numeral 9 in Figs. 1-4 and are described between page 6, line 26 and page 8, line 1 of the Specification of the instant application.

said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs

The lower edge of the projections 9 of the outer webs 3 is identified by reference numeral 12 in Fig. 1 (which also shows that the lower edge 12, which is part of the projection 9 and is therefore part of the outer web 3, is identical to the lower edge of the outer web 3) and is described in lines 14-15 on page 7 of the Specification of the instant application.

and projecting outwardly to a greater extent than said given extent of said gills,

A distance between the projections 9 and a channel 8 is identified by reference numeral 11 and a distance between the gills 5 and the channel 8 is identified by reference numeral 10 in Fig. 3, and the greater projection of

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the projections 9 than the gills 5 is described in lines 5-11 on page 7, of the Specification of the instant application.

**said projections being disposed in a region of a respective said inner web;
and**

The projections 9 being assigned to a region of the inner web 2 is shown in Figs. 1-4 and is described in lines 10-11 on page 7 of the Specification of the instant application.

a deflector lug formed integrally on a lower edge of said projections.

The deflector lug is identified by reference numeral 13 in Figs. 1-4 and is described between page 7, line 13 and page 8, line 5 of the Specification of the instant application.

References Cited:

JP 7-43486	Mitsutake et al.	February 14, 1995
EP 0 557 085	Matzner et al.	August 25, 1993
U.S. 4,692,302	DeMario et al.	September 8, 1987
U.S. 6,744,843	Kang et al.	June 1, 2004
JP 02002980		January 8, 1990

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Grounds of Rejection to be Reviewed on Appeal

1. Whether or not claims 1, 2, 4 and 6 are obvious over JP 7-43486 in view of EP 0 557 085 A1 and DeMario et al (U.S. 4,692,302) under 35 U.S.C. § 103(a).
2. Whether or not claim 5 is obvious over JP 7-43486, EP 0 557 085 A1 and DeMario et al. (U.S. 4,692,302) and further in view of Kang et al. (U.S. 6,744,843) under 35 U.S.C. § 103(a).
3. Whether or not claim 6 is obvious over JP 7-43486, EP 0 557 085 A1 and DeMario et al. (U.S. 4,692,302) and further in view of JP 02002980 under 35 U.S.C. § 103(a).

Argument:

I. The rejections of the Claims

In item 3 on pages 4-6 of the final Office action, claims 1, 2, 4 and 6 have been rejected as being unpatentable over Japanese Patent JP 7-43486 in view of European Application EP 0 557 085 A1 and U.S. Patent No. 4,692,302 to DeMario et al. (hereinafter DeMario), under 35 U.S.C. § 103(a).

In item 4 on page 6 of the final Office action, claim 5 has been rejected as being unpatentable over JP 7-43486 in view of EP 0 557 085 A1 and DeMario and further in view of U.S. Patent No. 6,744,843 to Kang et al. (hereinafter Kang), under 35 U.S.C. § 103(a).

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In Item 5 on pages 6-7 of the final Office action, claim 6 has been rejected as being unpatentable over JP 7-43486 in view of EP 0 557 085 A1 and DeMario and further in view of Japanese Publication No. JP 02002980, under 35 U.S.C. § 103(a).

II. The limitations of Claim 1

Before discussing the prior art in detail, it is believed that a brief review of the invention as claimed, would be helpful. Claim 1 calls for, *inter alia*, a spacer for a fuel assembly of a boiling water reactor, comprising:

a frame formed with outer webs and inner webs oriented crossways with respect to one another;

gills formed on an outer side of said outer webs and projecting outward to a given extent from said outer side;

a plurality of projections each formed by an outward bulge in a wall of said outer webs, said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs and projecting outwardly to a greater extent than said given extent of said gills, said projections being disposed in a region of a respective said inner web; and

a deflector lug formed integrally on a lower edge of said projections.

Thus, claim 1 calls for:

gills formed on an outer side of said outer webs and projecting **outward** to a given extent from said outer side; and

a plurality of projections each formed by an **outward** bulge in a wall of said outer webs, **said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs** and projecting outwardly to a greater extent than said given extent of said gills.

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III. The Rejection of Claim 1 Compared to the Prior Art

In item 3 of the Office Action, the Examiner has relied upon JP 7-43486 to show gills and projections on the same side of a strip in Fig. 5 thereof. The Examiner has also acknowledged that JP 7-43486 does not show gills and projections projecting in the same direction.

The gills and projections in the invention of the instant application project in the same direction, but the projections 9 project further toward the channel 8 than the gills 5 as claimed, in order to protect the gills. However, they project in different directions in JP 7-43486, and therefore the reference teaches away from the invention as claimed and no amount of manipulation by an attempt to combine JP 7-43486 with other references can cure the deficiency of the reference and thus of the rejection.

The Examiner applies EP 0 557 085 A1 to show more extensive projections to protect less extensive projections. However, the more extensive projections in EP 0 557 085 A1 are leaf springs 61-64 which are intended to give or yield with a certain amount of play. That is the reason for using springs. Such springs may be adequate to protect protrusions 41-44 used in EP 0 557 085 A1. However, they are totally inadequate to protect gills, as claimed in the instant application. Such gills would be crushed if springs as in EP 0 557 085 A1 were used, instead of projections as recited in claim 1 of the instant application. Therefore, the leaf springs and projections of EP 0 557 085 A1 cannot render the projections and gills, respectively, of claim 1 obvious.

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The Examiner uses JP 7-43486 to show deflector lugs in Fig. 2b thereof that "extend above or below a projecting surface, [and] read on the appended limitations of claim 1." However, the "appended limitations of claim 1" were the addition of the wording "said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs."

It is not understood how the deflector lugs, as characterized by the Examiner, which the Examiner acknowledges "extend above or below a projecting surface" can possibly render obvious "projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs."

As can be seen in Fig. 1 of the instant application, the projections 9 on the outer webs 3 have a lower edge which is identical to the lower edge of the outer web 3. This is certainly not suggested by what the Examiner calls deflector lugs that "extend above or below a projecting surface" in JP 7-43486. It can be seen that elements 13 and 25 shown in Figs. 2b and 9 of JP 7-43486 definitely do not have "a lower edge extending to and being identical with a lower edge of a respective one of said outer webs" as recited in claim 1. This limitation of claim 1 is, therefore, absolutely not shown in or suggested by the prior art.

Finally, the Examiner relies upon DeMario to show a limitation of claim 4, which will be discussed below.

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IV. The Response to Arguments in the Final Office Action

On page 3 of the final Office action, the Examiner states that the features of the claimed invention cannot be found in any of the references, but each feature can be acquired from one reference or another as having known advantages. According to the Examiner, the test is "what the combined teachings of the references would have suggested to those of ordinary skill in the art." In the Examiner's opinion, it would be within the purview of the skilled artisan to combine the known features for obtaining an optimized spacer grid.

A. Projections and Gills

Thus, according to the Examiner, it would first of all be obvious to utilize the technology to be acquired from EP 0 557 085 A1, the structure and function of which corresponds to the outer side of the outer webs of the invention of the instant application. In doing so, the Examiner equates the structure and function of the spring elements 61-64 (see Fig. 6) with the function of a stationary (fixed) protrusion (projection). This is not correct since EP '085 also mentions projections 45-48 or 41-44, on one hand and leaf springs or spring elements, on the other hand. It is therefore clear that there is a structural difference between a "projection" on one hand and "leaf springs" on the other hand. The leaf springs 61-64 are intended to serve for pressing the projections 45-48, which project further from the outer side of the outer webs, against the inner side of the water channel, in order to ensure that the entire fuel assembly is thus centered within the water channel. The projections 41-44 that are present at the other two sides (31 and 32) and project less far are supposed to maintain a minimal gap or clearance between the outer web and the inner side of the water channel. In order to ensure that this clearance

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is available, the spring elements must give way or be able to be compressed at least to an extent that corresponds with the clearance. Accordingly, when inserting the fuel assembly into the water channel, the smaller projections 41-44 come into contact with the upper edge as well as with the inner side of the water channel.

However, it is an object of the invention of the instant application to prevent such contact by using projections projecting beyond the gills and thus protecting them against making contact with the water channel. Even if one were to attach spring elements 61-64 and projections 41-44 protruding less far than the spring elements to all of the outer webs, the situation would not be any different. Thus, EP '085 cannot be described as representing "technology that is substantially similar in structure and function to the outer side of the outer webs of the presently claimed spacer" (sentence bridging pages 4 and 5 of the final Office action).

B. A Plurality of Projections each Formed by an Outward Bulge in a Wall of the Outer Webs and Disposed in a Region of a Respective Inner Web

On page 2 of the Office action, the Examiner has discussed the limitation of claim 1 calling for "a plurality of projections each formed by an outward bulge in a wall of said outer webs, said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs." In particular, the Examiner has expressed an opinion that "this lower edge may not necessarily bulge outwardly in the same way as the projection itself."

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However, the above-quoted portion of claim 1 is unambiguous and clearly expresses that the projections 9 are each formed by an outward bulge in the outer webs 3, but have a lower edge 12 identical to the lower edge of the outer webs 3, which edge extends in a straight line, as seen in Figs. 1 and 2. Furthermore, the deflector lug 13 is formed integrally at the lower edge of the projection.

The Examiner has also mentioned U.S. Patent No. 5,307,392 to Bryan in this regard. However, it is not understood why this reference is being mentioned. If the Examiner intends to rely on Bryan because the rejection is inadequate without it, then prosecution should be reopened by issuing a new non-final Office action so that Appellant has an opportunity to properly consider the reference. If the Examiner is of the opinion that Bryan is not needed, then it should not be mentioned.

In any event, a cursory view of the Bryan reference shows that it pertains to fuel assemblies for pressurized water reactors. Such fuel assemblies are not encompassed by a water channel and stand side by side in the reactor core, in such a way that there is a gap between them or between the outer webs of their spacers. In order to reduce the mutual impact of force upon the spacers, when adjacent fuel assemblies impinge upon one another during the operation of the reactor core, US 4,897,241 to Anthony, cited as prior art Bryan, discloses the provision of spring elements at one outer web of two adjacent spacers in order to reduce the forces that occur when two fuel assemblies impinge upon one another laterally. In the case of the spacers in Bryan, it is just such spring elements that

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project from the outer side of an outer web that are to be avoided. There are specifically no projections at the outer sides of the outer webs, so that adjacent spacers can impinge upon one another over a large surface. In the embodiments of Figs. 4 and 6, that is achieved in such a way that the outer webs are fixed at the inner webs or internal strips 108 by an inwardly projecting region 102 or 230. The sections of the respective outer webs 104, 106 or 204, 206 are flanged on the upper and lower sides. The inwardly projecting regions 102 or 230 are not fixed at the inner webs 108 but are spaced apart from them so that they act like spring elements.

Bryan does not show or suggest "a plurality of projections each formed by an outward bulge in a wall of said outer webs, said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs."

Fig. 9 of JP 7-43486 discloses deflector lugs 25 in a spacer at a lower edge of an outer web. They are, however, not formed integrally at the lower edge of a projection formed by an outward bulge in a wall of the outer web, but instead are at a lower edge of the outer web which extends in a straight line and does not bulge out, that is forwardly.

Additionally, it must be emphasized that, in the spacer allegedly having gills 20 according to Fig. 5 of JP 7-43486, there are no deflector lugs at all at the lower side of the spacer. Even if one were to provide them in a manner according to Fig. 9 in the spacer of Fig. 5, they could not at all develop the protective effect for

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the gills when inserting a fuel assembly into a water channel, since the gills would project above their bases formed integrally at the outer webs, so that the latter, for example, would impinge upon the upper edge of a water channel.

C. The limitations of Claim 4

The Examiner has also applied the DeMario reference in the rejection of claim 4. DeMario pertains to a fuel assembly for a pressurized water reactor, which has guide thimbles 24 seen in Fig. 1 and described in column 4, lines 56-58 thereof. Projections 64 are disposed at outer webs 58 of the spacer, but they extend toward the inner side. The Examiner apparently believes that there is a projection in a section of the outer web that extends between the projections 64, into which projection inner webs 74 extend. However, as can be seen in Figs. 3 and 5, the projections 64 extending inwardly are respectively disposed laterally next to the inner webs 44, 74. **The inner webs show a projecting area which, however, does not extend into a projection but into a slot of the outer webs** (see column 8, lines 41-45 of DeMario).

In contrast to DeMario, claim 4 of the instant application states that "said inner web has a lateral edge and a first supporting section integrally formed on and laterally projecting beyond said lateral edge, wherein said first supporting section extends into and is connected to said projection." Therefore, even the structure and function recited in claim 4 are not shown or suggested by the prior art.

In summary, it is seen that contrary to the statements of the Examiner in the last paragraph on page 3 of the Office action, the features of the claims are not

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individually established as known and merely need to be combined. Rather, many claimed features are nowhere to be found in the prior art and in some instances the prior art teaches away from such features, as explained in detail above.

It is believed to be clear that the structure and function recited in claims 1, 2 and 4 are only described by the Examiner as being obvious because the Examiner has had the advantage of studying Appellant's disclosure. The Examiner has only arrived at a different conclusion because of an inadmissible hindsight reconstruction and an incorrect interpretation of the state of the art.

D. The limitations of Claims 5 and 6

With respect to claim 5, the Examiner's arguments are based on a single figure, namely Fig. 2 of Kang. However, **Kang does not show inner webs which adjoin the deflector lugs.**

With regard to claim 6, it is noted that it is known in principle to provide inner webs with laterally projecting areas, which engage in slots of the outer webs, as in the spacer of JP 02002980. In accordance with the invention, however, the inner web extends into a projection, in which case the slot is present in a recess of the projection. This configuration permits a problem-free application of a welding seam without having to smooth it later. This welding seam is in the recess so that it cannot come into contact with the inner wall of the water channel. **Such a configuration cannot be obtained from the JP 02002980 reference.**

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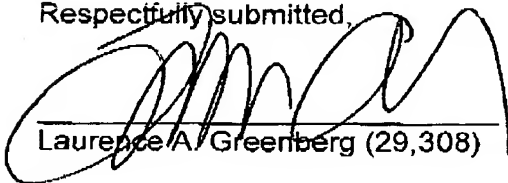
V. Summary

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1, 2 and 4-6 and the claims are therefore believed to be patentable over the art.

The honorable Board is therefore respectfully urged to reverse the final rejection of claims 1, 2 and 4-6 by the Primary Examiner.

If an extension of time is required for this submission, petition for extension is herewith made. Any fees due should be charged to Deposit Account No. 12-1099 of Lerner Greenberg Sterner LLP.

Respectfully submitted,



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Claims Appendix:

Claim 1. A spacer for a fuel assembly of a boiling water reactor, comprising:

a frame formed with outer webs and inner webs oriented crossways with respect to one another;

gills formed on an outer side of said outer webs and projecting outward to a given extent from said outer side;

a plurality of projections each formed by an outward bulge in a wall of said outer webs, said projections each having a lower edge extending to and being identical with a lower edge of a respective one of said outer webs and projecting outwardly to a greater extent than said given extent of said gills, said projections being disposed in a region of a respective said inner web; and

a deflector lug formed integrally on a lower edge of said projections.

Claim 2. The spacer according to claim 1, wherein said projections are formed below said gills.

Claim 3 (canceled).

Claim 4. The spacer according to claim 1, wherein said inner web has a lateral edge and a first supporting section integrally formed on and laterally projecting beyond said lateral edge, wherein said first supporting section extends into and is connected to said projection.

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Claim 5. The spacer according to claim 4, wherein said inner web has a lower edge and a second supporting section integrally formed on said lower edge, said second supporting section having an inclined edge and a deflector lug supported against said inclined edge.

Claim 6. The spacer according to claim 4, wherein said projection has an outer side formed with a recess, said recess extends in an axial direction and having formed therein a slot with said first supporting section at least partially penetrating through said slot.

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Evidence Appendix:

No evidence pursuant to §§ 1.130, 1.131, or 1.132 or any other evidence has been entered by the Examiner and relied upon by Appellant in the appeal.

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Related Proceedings Appendix:

No prior or pending appeals, interferences or judicial proceedings are in existence which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal. Accordingly, no copies of decisions rendered by a court or the Board are available.